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rise to the conception that he has a considerable function to perform in the order of events, and that his exertions are needed; that he should look upon himself more "as a freeman, with power of shaping the course of future humanity." The question, "How man can assist in the order of events," he answers, "by furthering the course of evolution." This means that man "may use his intelligence to discover and expedite the changes that are necessary to adapt circumstances to race and race to circumstances, and his kindly sympathy will urge him to effect them mercifully."

The book should be read by physicians, moralists, philanthropists, biologists and intelligent parents, as well as the civil service reformer, in fact by everyone interested in the advancement of mankind, whether they accept all the author's conclusions or not.

THE TORTUGAS AND FLORIDA REEFS.[1]—Professor Agassiz commences this memoir by the statement that Darwin's theory of reef formation will not apply to the peculiar conditions existing along the Straits of Florida. The southern extremity of Florida was shown by the elder Agassiz to be of comparatively recent growth, and the mode of growth of the present reef, keys and mud-flats to be identical in its nature with past action. The whole southern part of Florida is built of concentric barrier reefs, cemented into continuous land by the accumulation and consolidation of mud flats between them. The curve of the Florida reefs is due, in great part, to a counter current running westward along the reef. When storms occur, the fine silt of the bank is taken into the bay back of the keys and deposited there. The counter current then carries this to the westward, and thus material is added to the flats. No trace of Mississippi mud has ever been found in any of the soundings taken east of the Mississippi. The line of keys seems to be formed by the waste of the present reef, rather than by the remains of an older anterior reef. The Tortugas at the very extremity of the slope upon which the line of the Florida reefs has been built up, are the most recent of the reefs, and are as yet without the mud flat on their northern side. For the production of such a group it is evident that a knoll must first have been raised from the ocean bottom to a depth at which it is possible for corals to live. Such a knoll may well have been formed by the detritus driven to the westward by the prevailing easterly winds and the currents running westward. An incipient coral reef is already forming upon a patch to the westward of Tortugas. The backbone of Florida was first produced by a fold in the earth's crust, but in the northern portion of the Everglades commences the series of concentric reefs which have, little by little, built up Florida toward the south. The amount of animal life which can be sustained upon a small area, under suitable conditions, can only be understood by those who have dredged near the hundred fathom line on the west coast of the great Florida plateau. The dredge not unfrequently brings up large fragments of modern limestone, consisting of the dead carcasses of the species now living on the top.

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[1] *The Tortugas and Florida Reefs.* By ALEXANDER AGASSIZ. From Memoirs of American Academy of Arts and Sciences, Vol. XI.

The *Challenger* and *Tuscarora* soundings have shown the existence of submarine elevations of volcanic origin, forming extensive banks, serving as foundations for barrier reefs and atolls, and wherever such plateaux reach, on their windward side, a level at which corals prosper, there coral reefs spring up and flourish. At lower levels are plateaux where mollusks, corals, echinoderms, etc., find the materials necessary for their coverings. These great submarine beds of modern limestone lie in the very track of the ocean currents, and gain from them the carbonate of lime they require. Murray's experiments seem to prove that this amounts to sixteen tons for every square mile a hundred fathoms deep. The foundation for a coral reef is formed by the accumulation of limestone and other animal remains upon an early fold of the earth's crust, or upon a volcanic plateau, and corals do not encrust the surface until the bank has risen to their bathymetrical limit. Thus the deposition of animal débris comes in as a supplement to elevation and subsidence, which alone were taken note of by the theory of Darwin and Dana, and accounts for the raising of plateaux in regions where there has been little or no change of level from other causes, to a height favorable for the growth of reef-building corals.

GROFF'S MINERAL ANALYSIS.[1]—This is a series of one hundred octavo pages giving blanks for the student to fill out under the different physical characters and chemical reactions of minerals. They are conveniently arranged and accompanied by a syllabus of terms most commonly used in describing minerals. It will be found useful in laboratory work.

### RECENT BOOKS AND PAMPHLETS.

*Upham, Warren.*—Lake Agassiz, a chapter in Glacial Geology. Ext. Bull. Minn. Acad. N. S., Vol. II. From the author.

*Harger, Oscar.*—Report on the Isopoda. Bull. Mus. Comp. Anat., Vol. XI, No. 4. Cambridge, 1883. From the author.

*Dewey, F. P.*—Porosity and specific gravity of Coke. Ext. Trans. Amer. Inst. Mining Eng., 1883.

*Hunt, A. E.*—Some notes and tests of an open-hearth steel charge made for boiler plate. Ext. idem.

*Stone, G. C.*—The determination of Manganese in Spinel. Ext. idem.

*Brinton, D. G.*—The Folk-lore of Yucatan. Ext. from the Folk-lore Journal, Vol. I, Pt. VIII, London, Eng., 1883. From the author.

*Allen A.*—The Journal of the Postal Microscopical Society, London, 1883. From the editor.

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[1] *Mineral Analysis.* Designed by Professor Geo. G. Groff, M.D. Second edition. Lewisburg, Pa., Science and Health Publishing Co., 1883. 8vo.